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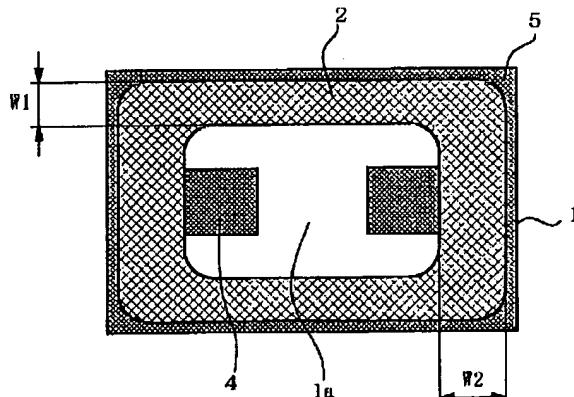
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(54)【発明の名称】 電子部品収納用パッケージおよびその封止方法

(57)【要約】

【課題】 金属枠体に金属蓋体をシーム溶接する際に、絶縁基体にクラックが発生したり、あるいは金属枠体に剥離が発生したりすることのない気密信頼性に優れる電子部品収納用パッケージおよびその封止方法を提供すること。

【解決手段】 上面に電子部品6が搭載される搭載部1aを有する絶縁基体1の上面に、搭載部1aを取り囲む略四角枠状の金属枠体2をろう付けして成り、この金属枠体2上に金属蓋体3を接合するようになした電子部品収納用パッケージにおいて、金属枠体2は、その一方の相対向する辺における幅W1に対して他方の相対向する辺における幅W2が1.2~2倍である。



【特許請求の範囲】

【請求項1】 上面に電子部品が搭載される搭載部を有する絶縁基体の上面に、前記搭載部を取り囲む略四角柱状の金属枠体をろう付けして成り、該金属枠体上に金属蓋体を接合するようになした電子部品収納用パッケージにおいて、前記金属枠体は、その一方の相対向する辺における幅に対して他方の相対向する辺における幅が1.2～2倍であることを特徴とする電子部品収納用パッケージ。

【請求項2】 上面に電子部品が搭載される搭載部を有する絶縁基体の上面に、前記搭載部を取り囲むように、一方の相対向する辺における幅に対して他方の相対向する辺における幅を1.2～2倍とした略四角柱状の金属枠体をろう付けして成るパッケージ本体に対して、前記金属枠体の上面に金属蓋体を載置し、これら金属枠体と金属蓋体とを前記一方の相対向する辺に沿ってシーム溶接した後、前記他方の相対向する辺に沿ってシーム溶接することを特徴とする電子部品収納用パッケージの封止方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、半導体素子や圧電振動子、表面弹性波素子等の電子部品を収容するための電子部品収納用パッケージおよびその封止方法に関するものである。

【0002】

【従来の技術】 従来、半導体素子や圧電振動子等の電子部品を収容するための小型の電子部品収納用パッケージは、図6に斜視図で示すように、酸化アルミニウム質焼結体や窒化アルミニウム質焼結体・ムライト質焼結体・ガラスーセラミックス等の電気絶縁材料から成り、その上面中央部に電子部品16を搭載するための凹状の搭載部11aを有するとともに搭載部11a内から下面外周部にかけて導出する複数のメタライズ配線導体14および上面に搭載部11aを取り囲むように被着されたろう付け用メタライズ層15を有する絶縁基体11と、この絶縁基体11のろう付け用メタライズ層15に、搭載部11aを取り囲むようにして銀-銅ろう等のろう材を介して接合された鉄ニッケルコバルト合金等の金属から成る略四角柱状の金属枠体12と、この金属枠体12の上面にシーム溶接法等により接合される鉄ニッケルコバルト合金等の金属から成る金属蓋体13とから構成されている。

【0003】 そして、この従来の電子部品収納用パッケージによれば、絶縁基体11の搭載部11a底面に電子部品16を搭載するとともにこの電子部品16の電極を搭載部11a内のメタライズ配線導体14に例えば半田や導電性樹脂、ボンディングワイヤ等から成る電気的接続手段を介して電気的に接続し、かかる後、金属枠体12の上面に金属蓋体13をシーム溶接法により溶接することによって絶縁基体11と金属枠体12と金属蓋体13とから成る容器の内

部に電子部品16が気密に封止され、それにより製品としての電子装置となる。

【0004】 なお、金属枠体12は、鉄ニッケルコバルト合金の板材に打ち抜き金型により打ち抜き加工を施すことにより製作され、通常、その各辺における幅が略同じとなるように形成されている。

【0005】 また、この金属枠体12上に金属蓋体13をシーム溶接するには、金属枠体12上に金属蓋体13を載置するとともに、金属蓋体13の一方の相対向する外周辺にシーム溶接機の一対の電極ローラーを押圧転動させながらこの一対のローラー電極間に溶接のための大電流を流して金属枠体12および金属蓋体13の一方の相対向する辺側を接合させた後、金属蓋体13の他方の相対向する外周辺にシーム溶接機の一対の電極ローラーを押圧転動させながらこの一対のローラー電極間に溶接のための大電流を流して金属枠体12および金属蓋体13の他方の相対向する辺側を接合させる方法が採用されている。

【0006】

【発明が解決しようとする課題】 しかしながら、このような電子部品収納用パッケージによれば、絶縁基体11の搭載部11aに電子部品16を搭載固定した後、金属枠体12の上面に金属蓋体13をシームウエルド法等により溶接する際に、金属枠体12および金属蓋体13の一方の相対向する辺側を溶接した後、金属枠体12および金属蓋体13の他方の相対向する辺側を溶接すると、金属枠体12および金属蓋体13の他方の相対向する辺側を溶接する時には金属枠体12および金属蓋体13の一方の相対向する辺側がすでに溶接されており、この溶接されている部分を介して金属蓋体13から金属枠体12に電流が流れやすくなるため、シーム溶接機のローラー電極直下において金属蓋体13と金属枠体12との接触部を介して金属枠体12に流れる電流が小さなものとなる。そこで、金属枠体12および金属蓋体13の他方の相対向する辺側を溶接する際にはシーム溶接機の一対のローラー電極間に流す電流を金属枠体12および金属蓋体13の一方の相対向する辺側を溶接するときよりも大きな電流とすることによりシーム溶接機のローラー電極直下において金属蓋体13と金属枠体12との接触部を介して金属枠体12に流れる電流を溶接のために必要な大きさとなるようにしている。ところが、このように金属枠体12および金属蓋体13の他方の相対向する辺側を溶接する際に金属枠体12および金属蓋体13の一方の相対向する辺側を溶接するときよりも大きな電流をシーム溶接機の一対のローラー電極間に流すことから、金属枠体12および金属蓋体13の他方の一対の辺側を溶接する際にシーム溶接機の一対のローラー電極間に流れる電流による発熱量が大きくなり、そのため、その発熱による熱衝撃や熱応力により絶縁基体にクラックが発生したり、あるいは金属枠体12に剥離が発生したりしてパッケージの気密性が大きく損なわれてしまうことがあった。

【0007】 本発明は、かかる従来の問題点に鑑み案出

されたものであり、その目的は、金属枠体に金属蓋体をシームウエルド法により溶接する際に、絶縁基体にクラックが発生したり、あるいは金属枠体に剥離が発生したりすることのない気密信頼性に優れる電子部品収納用パッケージおよびその封止方法を提供することにある。

【0008】

【課題を解決するための手段】本発明の電子部品収納用パッケージは、上面に電子部品が搭載される搭載部を有する絶縁基体の上面に、搭載部を取り囲む略四角枠状の金属枠体をろう付けして成り、この金属枠体上に金属蓋体を接合するようになした電子部品収納用パッケージにおいて、金属枠体は、その一方の相対向する辺における幅に対して他方の相対向する辺における幅が1.2～2倍であることを特徴とするものである。

【0009】また、本発明の電子部品収納用パッケージの封止方法は、上面に電子部品が搭載される搭載部を有する絶縁基体の上面に、搭載部を取り囲むように、一方の相対向する辺における幅に対して他方の相対向する辺における幅を1.2～2倍とした略四角枠状の金属枠体をろう付けして成るパッケージ本体に対して、金属枠体の上面に金属蓋体を載置し、これら金属枠体と金属蓋体とを一方の相対向する辺に沿ってシーム溶接した後、他方の相対向する辺に沿ってシーム溶接することを特徴とするものである。

【0010】本発明の電子部品収納用パッケージによれば、金属枠体の一方の相対向する辺における幅に対して他方の相対向する辺における幅を1.2～2倍としたことから、金属枠体および金属蓋体の一方の相対向する辺側をシーム溶接した後、他方の相対向する辺側をシーム溶接する際に、シーム溶接機のローラー電極直下において金属蓋体と金属枠体との接触部の面積が広いものとなり、その分、この面積の広い接触部を介してシーム溶接のための電流が金属枠体に流れやすくなるので、シーム溶接機の一対のローラー電極間に流す電流を小さいものとすることができます。同時に、金属枠体の他方の相対向する辺における幅が一方の辺における幅よりも1.2～2倍広いことから、この他方の辺側をシーム溶接する際に発生する熱衝撃や熱応力を金属枠体の他方の辺において良好に吸収することができる。

【0011】また、本発明の電子部品収納用パッケージの封止方法によれば、金属枠体の上面に金属蓋体を載置するとともに、金属枠体と金属蓋体とを金属枠体の幅が狭い一方の相対向する辺に沿ってシーム溶接した後、金属枠体の幅が1.2～2倍広い他方の相対向する辺に沿ってシーム溶接することから、金属枠体の幅が広い他方の相対向する辺に沿ってシーム溶接する際に、シーム溶接機のローラー電極直下において金属蓋体と金属枠体との接触部の面積が広いものとなり、その分、この接触部を介してシーム溶接のための電流が金属枠体に流れやすくなるので、シーム溶接機の一対のローラー電極間に流す

電流を小さいものとしてこの電流による熱衝撃や熱応力を小さなものとすることができます。同時に、金属枠体の他方の相対向する辺においてはその幅が一方の相対向する辺における幅よりも1.2～2倍広いことから、この他方の辺側をシーム溶接する際に発生する熱衝撃や熱応力を金属枠体の他方の辺で良好に吸収することができる。

【0012】

【発明の実施の形態】次に、本発明を添付の図面を基に説明する。

【0013】図1は、本発明の電子部品収納用パッケージの実施の形態の一例を示す斜視図であり、図中、1は絶縁基体、2は金属枠体、3は金属蓋体である。そして、主にこれらで電子部品6を気密に収容する容器が構成される。

【0014】絶縁基体1は、一辺の長さが2～20mm程度で厚みが0.5～3mm程度の略四角形状であり、その上面中央部に電子部品6を搭載するための略四角凹状の搭載部1aが設けてある。この搭載部1aには電子部品6が搭載固定される。

【0015】このような絶縁基体1は、酸化アルミニウム質焼結体や塗化アルミニウム質焼結体・ムライト質焼結体・ガラスーセラミックス等の電気絶縁材料から成り、例えば酸化アルミニウム質焼結体から成る場合であれば、酸化アルミニウム・酸化珪素・酸化カルシウム・酸化マグネシウム等の原料粉末に適當な有機バインダ・溶剤を添加混合して泥漿状となすとともにこれを従来周知のドクタブレード法等を採用してシート状となすことによって複数枚のセラミックグリーンシートを得、しかる後、これらのセラミックグリーンシートの各々に適當な打ち抜き加工を施すとともにこれらを上下に積層し、約1600°Cの温度で焼成することによって製作される。

【0016】また、絶縁基体1には、搭載部1aの底面から側面を介して下面に導出する複数のメタライズ配線導体4が被着形成されている。メタライズ配線導体4は、搭載部1aに搭載される電子部品6の各電極を外部の電気回路に電気的に接続するための導電路として機能し、その搭載部1a底面部位には電子部品6の各電極が半田や導電性樹脂・ボンディングワイヤ等の電気的接続手段を介して電気的に接続され、また絶縁基体1の下面に導出した部位は半田等から成る電気的接続手段を介して外部電気回路に接続される。

【0017】このようなメタライズ配線導体4は、タンクステンやモリブデン・銅・銀等の金属粉末メタライズから成り、タンクステン等の金属粉末に適當な有機バインダ・溶剤を添加混合して得た金属ペーストを絶縁基体1用のセラミックグリーンシートにスクリーン印刷法により所定パターンに印刷塗布し、これを絶縁基体1用のセラミックグリーンシート積層体とともに焼成することによって絶縁基体1の搭載部1a底面から側面を介して下面に導出するように被着形成される。

【0018】なお、メタライズ配線導体4の表面には、メタライズ配線導体4が酸化腐食するのを有効に防止するとともにメタライズ配線導体4と電気的接続手段との接続性を良好なものとするために、通常であれば、厚みが1～10μm程度のニッケルめっき層および厚みが0.1～3.0μm程度の金めっき層が従来周知の電解めっき法や無電解めっき法により順次被着されている。

【0019】さらに、絶縁基体1の上面には、搭載部1aを取り囲むようにしてタンクスチンやモリブデン・銅・銀等の金属粉末メタライズから成る略四角柱状のろう付け用メタライズ層5が被着形成されている。このろう付け用メタライズ層5は、厚みが10～20μm程度、各辺の幅が0.2～1mm程度であり、絶縁基体1に金属枠体2を接合するための下地金属として機能する。そして、このろう付け用メタライズ層5の上面には、搭載部1aを取り囲む略四角柱状の金属枠体2が銀ろう等のろう材を介してろう付けされている。このようなろう付け用メタライズ層5は、例えばタンクスチン等の金属粉末に適当な有機バインダ・溶剤を添加混合して得た金属ペーストを絶縁基体1用のセラミックグリーンシートにスクリーン印刷法により所定パターンに印刷塗布し、これを絶縁基体1用のセラミックグリーンシート積層体とともに焼成することによって絶縁基体1の上面に搭載部1aを取り囲むようにして被着形成される。

【0020】なお、ろう付け用メタライズ層5の表面には、ろう付け用メタライズ層5とろう材との濡れ性を良好とするために、通常であれば、厚みが0.5～5μm程度のニッケルめっき層がろう付けの前に予め被着されている。

【0021】また、ろう付け用メタライズ層5に銀ろう等のろう材を介してろう付けされた金属枠体2は、例えば鉄-ニッケル合金や鉄-ニッケル-コバルト合金等の金属から成り、金属蓋体3を絶縁基体1に接続するための下地金属部材として機能する。この金属枠体2は、図2に絶縁基体1および金属枠体2の上面図で示すように、その内周が凹部1aの開口と略同じ大きさであり、厚みが0.1～0.25mm程度、各辺の幅が0.15～1mm程度であり、さらに金属枠体2の一方の相対向する辺における幅W1に対して他方の相対向する辺における幅W2を1.2～2倍の広さとしている。

【0022】そして、図3に斜視図で示すように、金属枠体2の上面に金属蓋体3を載置するとともに、金属枠体2の幅が狭い側における金属蓋体3の相対向する外周辺上にシーム溶接機の一対のローラー電極Rを押圧転動させながらローラー電極R間にシーム溶接のための大電流を流して金属枠体2および金属蓋体3の一方の相対向する辺側をシーム溶接した後、図4に斜視図で示すように金属枠体2の幅が広い側における金属蓋体3の相対向する外周辺上にシーム溶接機の一対のローラー電極Rを押圧転動させながらローラー電極R間にシーム溶接のた

めの大電流を流して金属枠体2および金属蓋体3の他方の相対向する辺側をシーム溶接することにより、金属枠体2および金属蓋体3の全周が接合されて絶縁基体1と金属枠体2と金属蓋体3とから成る容器が気密に封止される。

【0023】なお、本発明の電子部品収納用パッケージにおいては、金属枠体2の一方の相対向する辺における幅W1に対して他方の相対向する辺における幅W2を1.2～2倍としていることが重要であり、さらに本発明の電子部品収納用パッケージの封止方法においては、金属枠体2の幅が狭い辺側をシーム溶接した後、他方の辺側をシーム溶接することが重要である。このように金属枠体2の一方の相対向する辺における幅W1に対して他方の相対向する辺における幅W2を1.2～2倍と広いものとし、金属枠体2の幅が狭い辺側をシーム溶接した後、他方の辺側をシーム溶接することから、他方の辺側をシーム溶接する際に、シーム溶接機のローラー電極R直下において金属蓋体3と金属枠体2との接触部の面積が広いものとなり、その分、この面積の広い接触部を介してシーム溶接のための電流が金属枠体2に流れやすくなるので、シーム溶接機の一対のローラー電極R間に流す電流を小さいものとしてこの電流による熱衝撃や熱応力を小さなものとするとともに、その熱衝撃や熱応力を金属枠体2の他方の辺において良好に吸収することができる。したがって、本発明の電子部品収納用パッケージおよび封止方法によれば、金属枠体2に金属蓋体3をシーム溶接する際に絶縁基体1にクラックが発生したり、金属枠体2に剥離が発生したりするのを有效地に防止することができる。

【0024】なお、金属枠体2の一方の相対向する辺における幅W1に対して他方の相対向する辺における幅W2が1.2倍未満の場合、金属枠体2および金属蓋体3の一方の相対向する辺側をシーム溶接した後、他方の相対向する辺側をシーム溶接する際に、シーム溶接機のローラー電極R直下において金属蓋体3と金属枠体2との接触部の面積を十分に広いものとすることことができず、そのため、より大きな電流をシーム溶接機の一対のローラー電極R間に流す必要があり、その電流による熱衝撃や熱応力が大きくなるとともに、それらの熱衝撃や熱応力を金属枠体2の他方の辺で良好に吸収することが困難となるので絶縁基体1にクラックが発生したり、金属枠体2に剥離が発生しやすくなる。他方、2倍を越えると、そのような幅の広い金属枠体2を設けるためにパッケージが大型化してしまう。したがって、金属枠体2の一方の相対向する辺における幅W1に対する他方の相対向する辺における幅W2は1.2～2倍の範囲に特定される。

【0025】このような金属枠体2は、鉄-ニッケル合金や鉄-ニッケル-コバルト合金等から成る板材をプレス機により打ち抜くことによって所定の枠状に製作される。

【0026】また、金属枠体2のろう付け用メタライズ層5へのろう付けは、金属枠体2をろう付け用メタライズ層5の上に例えれば厚みが10～50μmの箔状のろう材を挟んで載置し、かかる後、ろう材を加熱溶融させることによってろう付け用メタライズ層5と金属枠体2とをろう付けする方法が採用される。

【0027】なお、ろう付け後のろう付け用メタライズ層5の露出表面および金属枠体2の露出表面およびろう材の露出表面にはろう付け用メタライズ層5および金属枠体2およびろう材が酸化腐食するのを有効に防止するために、通常であれば、厚みが0.5～5μmのニッケルめっき層および厚みが0.1～3.0μm程度の金めっき層が従来周知の電解めっき法や無電解めっき法により順次被着されている。

【0028】かくして、本発明の電子部品収納用パッケージおよびその封止方法によれば、絶縁基体1の搭載部1aに電子部品6をその各電極がメタライズ配線導体4に電気的に接続されるようにして電気的接続手段を介して搭載固定した後、金属枠体2上に金属蓋体3を載置するとともに、金属枠体2と金属蓋体3とを、金属枠体2の幅が広い側の一方の相対向する辺側をシーム溶接した後に他方の相対向する辺側をシーム溶接することにより接合させ、それにより絶縁基体1と金属枠体2と金属蓋体3とから成る容器の内部に電子部品6が気密信頼性高く封止される。

【0029】なお、本発明は、上述の実施の形態例に限定されるものではなく、本発明の要旨を逸脱しない範囲であれば種々の変更は可能であることはいうまでもない。例えば上述の実施の形態の一例では、金属枠体2の幅はその長辺側で狭く、その短辺側で広くなっていたが、金属枠体2の幅は図5に上面図で示すように、その長辺側で広く、その短辺側で狭くなっていてもかまわない。

【0030】

【発明の効果】 本発明の電子部品収納用パッケージによれば、金属枠体の一方の相対向する辺における幅に対して他方の相対向する辺における幅を1.2～2倍としたことから、金属枠体および金属蓋体の一方の相対向する辺側をシーム溶接した後、他方の相対向する辺側をシーム溶接する際に、シーム溶接機のローラー電極直下において金属蓋体と金属枠体との接触部の面積が広いものとなり、その分、この面積の広い接触部を介してシーム溶接のための電流が金属枠体に流れやすくなるので、シーム溶接機の一対のローラー電極間に流す電流を小さいものとするとことができるとともに、この他方の辺側をシーム溶接する際に発生する熱衝撃や熱応力を金属枠体の他方の辺で良好に吸収することができる。したがって、絶縁基体にクラックが発生したり、金属枠体に剥離が発生したりすることのない気密信頼性に優れる電子部品収納用パッケージの封止方法を提供することができる。

「方の辺において良好に吸収することができる。したがって、絶縁基体にクラックが発生したり、金属枠体が剥離したりすることがない気密信頼性に優れる電子部品収納用パッケージを提供することができる。」

【0031】また、本発明の電子部品収納用パッケージの封止方法によれば、金属枠体の上面に金属蓋体を載置するとともに、金属枠体と金属蓋体とを一方の相対向する辺に沿ってシーム溶接した後、封止枠体の幅が1.2～2倍広い他方の相対向する辺に沿ってシーム溶接することから、封止枠体の幅が広い他方の相対向する辺に沿ってシーム溶接する際に、シーム溶接機のローラー電極直下において金属蓋体と金属枠体との接触部の面積が広いものとなり、その分、この接触部を介してシーム溶接のための電流が金属枠体に流れやすくなるので、シーム溶接機の一対のローラー電極間に流す電流を小さいものとしてこの電流による熱衝撃や熱応力を小さなものとすることことができるとともに、この他方の辺側をシーム溶接する際に発生する熱衝撃や熱応力を金属枠体の他方の辺で良好に吸収することができる。したがって、絶縁基体にクラックが発生したり、金属枠体に剥離が発生したりすることのない気密信頼性に優れる電子部品収納用パッケージの封止方法を提供することができる。

【図面の簡単な説明】

【図1】本発明の電子部品収納用パッケージの実施の形態の一例を示す斜視図である。

【図2】図1に示す電子部品収納用パッケージの絶縁基体1および金属枠体2の上面図である。

【図3】本発明の電子部品収納用パッケージの封止方法を説明するための斜視図である。

【図4】本発明の電子部品収納用パッケージの封止方法を説明するための斜視図である。

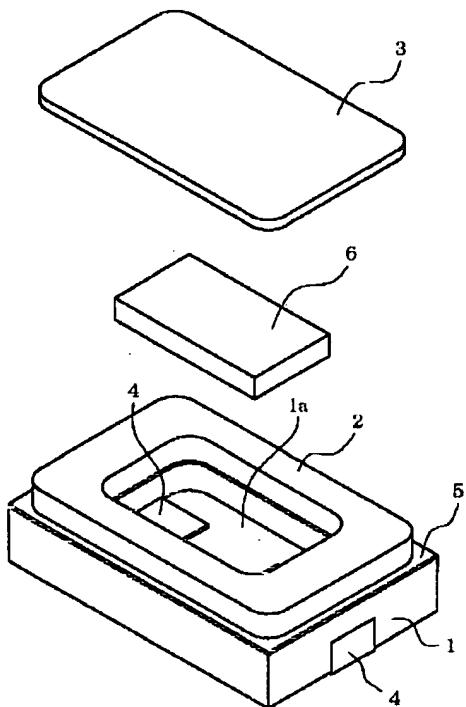
【図5】本発明の電子部品収納用パッケージの実施形態の他の例を示す図2に相当する上面図である。

【図6】従来の電子部品収納用パッケージを示す斜視図である。

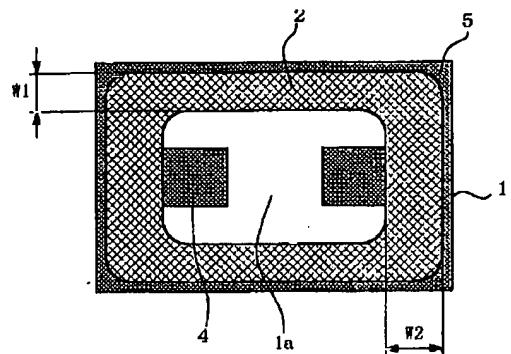
【符号の説明】

- 1 ····· 絶縁基体
- 1 a ···· 搭載部
- 2 ····· 金属枠体
- W 1 ····· 金属枠体2の一方の相対向する辺における幅
- W 2 ····· 金属枠体2の他方の相対向する辺における幅
- 3 ····· 金属蓋体
- 6 ····· 電子部品
- R ····· シーム溶接機のローラー電極

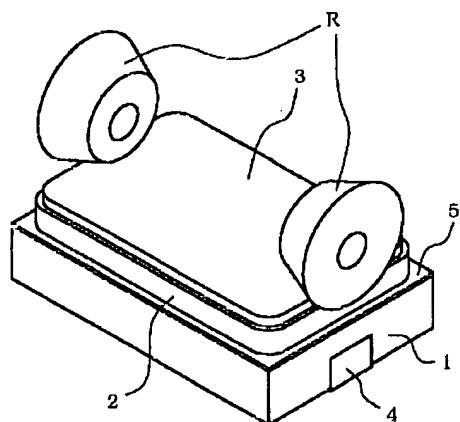
【図1】



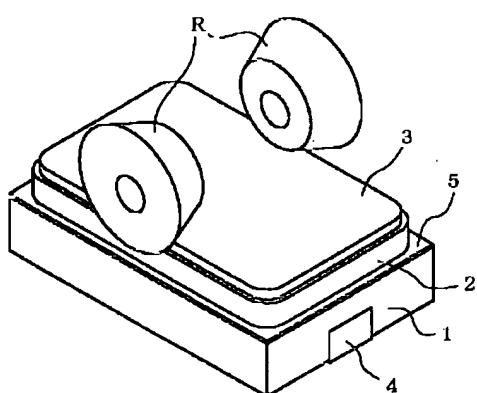
【図2】



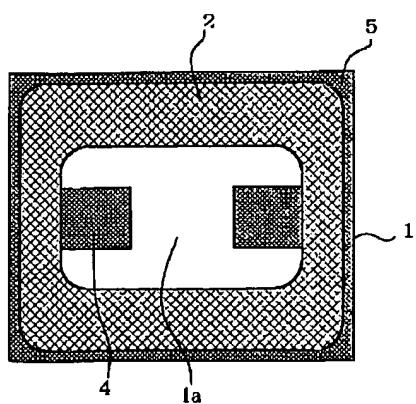
【図4】



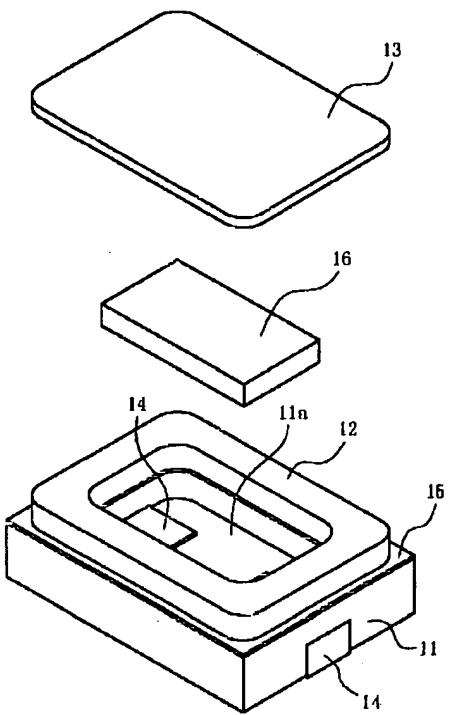
【図3】



【図5】



【図6】



PATENT ABSTRACTS OF JAPAN

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364011

(22)Date of filing : 30.11.2000 (72)Inventor : TAKATO TATSUJI

(54) PACKAGE FOR HOUSING ELECTRONIC COMPONENT AND METHOD FOR SEALING THE SAME

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a package for housing electronic components, which is excellent in the reliability of air tightness that an insulator body is not cracked and a metal frame is not flaked off when a metal cover is seam welded to the metal frame, and a method for sealing the package.

SOLUTION: The package for housing electronic component comprises: an insulator body 1 having a mounting portion 1a, on the front surface of which an electronic component 6 is mounted; a metal frame 2, which surrounds the mounting portion 1a and is nearly rectangular on the front surface of the insulator body 1; and a metal cover 3, which is soldered on the metal frame 2, where in the metal frame 2, the ratio of width W1 of one pair of sides facing each other to width W2 of the other pair of sides facing each other is 1.2 to 2.

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CLAIMS

[Claim(s)]

[Claim 1] In the package for electronic-parts receipt made as [join / on this metal frame / solder the metal frame of the shape of an abbreviation square frame which encloses said loading section on the top face of the insulating base which has the loading section by which electronic parts are carried in a top face, grow into it, and / a metal lid] Said metal frame is a package for electronic-parts receipt characterized by being 1.2 to 2 times the width of face in the side which carries out phase opposite to the width of face in the side as for which one of these carries out phase opposite in another side of this.

[Claim 2] So that said loading section may be surrounded on the top face of the insulating base which has the loading section by which electronic parts are carried in a top face As opposed to the package body which solders the metal frame of the shape of an abbreviation square frame which made width of face in the side which carries out phase opposite to the width of face in the side as for which one side carries out phase opposite in another side 1.2 to 2 times, and changes The closure approach of the package for electronic-parts receipt characterized by carrying out seam welding along the side which carries out phase opposite in said another side after laying a metal lid in the top face of said metal frame and carrying out the seam welding of these metal frame and the metal lid along the side as for which said one side carries out phase opposite.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the package for electronic-parts receipt and its closure approach for holding electronic parts, such as a semiconductor device, and a piezoelectric transducer, a surface acoustic wave device.

[0002]

[Description of the Prior Art] The small package for electronic-parts receipt for holding electronic parts, such as a semiconductor device and a piezoelectric transducer, conventionally As shown to drawing 6 in a perspective view, it consists of electrical insulation materials, such as a nature sintered compact of an aluminum oxide, and a nature sintered compact of aluminum nitride, a nature sintered compact of a mullite, glass ceramics. While having concave loading section 11a for carrying electronic parts 16 in the top-face center section two or more metallizing wiring derived from the inside of loading section 11a, covering over the inferior-surface-of-tongue periphery section -- it will be covered so that loading section 11a may be surrounded on a conductor 14 and the top face -- attaching -- business -- with the insulating base 11 which has a metallized layer 15 this -- it curses insulating base 11 -- attaching -- business -- with the metal frame 12 of the shape of an abbreviation square frame which consists of metals, such as an iron-nickel-cobalt alloy joined to it through wax material, such as a silver-copper wax, as enclosed loading section 11a in the metallized layer 15 It consists of metal lids 13 which consist of metals, such as an iron-nickel-cobalt alloy joined to the top face of this metal frame 12 by a seam welding method etc. [0003] and -- while carrying electronic parts 16 in the loading section 11a base of an insulating base 11 according to this conventional package for electronic-parts receipt -- the electrode of these electronic parts 16 -- metallizing wiring in loading

section 11a -- a conductor 14 -- for example, solder and conductive resin -- It connects electrically through the electrical connecting means which consists of a bonding wire etc. By welding the metal lid 13 to the top face of the metal frame 12 by the seam welding method after an appropriate time, the closure of the electronic parts 16 is airtightly carried out to the interior of the container which consists of an insulating base 11, the metal frame 12, and the metal lid 13, and this becomes an electronic instrument as a product.

[0004] in addition, width of face [in / usually / the metal frame 12 is manufactured by processing it by piercing to the plate of an iron-nickel-cobalt alloy and piercing with metal mold, and / each of that side] -- abbreviation -- it is formed so that it may become the same.

[0005] Moreover, in order to carry out the seam welding of the metal lid 13 on this metal frame 12 While laying the metal lid 13 on the metal frame 12 After joining the side side as for which passes the high current for welding and either the metal frame 12 or the metal lid 13 carries out phase opposite between the roller electrodes of this pair, carrying out press rolling of the electrode roller of the pair of a seam welder on the periphery side as for which one side of the metal lid 13 carries out phase opposite, The approach of joining the side side which passes the high current for welding and carries out phase opposite between the roller electrodes of this pair in another side of the metal frame 12 and the metal lid 13 is adopted carrying out press rolling of the electrode roller of the pair of a seam welder on the periphery side which carries out phase opposite in another side of the metal lid 13.

[0006]

[Problem(s) to be Solved by the Invention] However, after carrying out loading immobilization of the electronic parts 16 at loading section 11a of an insulating base 11 according to such a package for electronic-parts receipt, In case the metal lid 13 is welded to the top face of the metal frame 12 by the seam weld method etc. If the side side which carries out phase opposite in another side of the metal frame 12 and the metal lid 13 is welded after welding the side side as

for which either the metal frame 12 or the metal lid 13 carries out phase opposite The side side as for which either the metal frame 12 or the metal lid 13 carries out phase opposite when welding the side side which carries out phase opposite in another side of the metal frame 12 and the metal lid 13 is already welded.

Since a current becomes easy to flow to the metal frame 12 from the metal lid 13 through this part currently welded, the current which flows to the metal frame 12 through the contact section of the metal lid 13 and the metal frame 12 in directly under [of a seam welder / roller-electrode] becomes a small thing. There When welding the side side where either the metal frame 12 or the metal lid 13 carries out phase opposite of the current passed between the roller electrodes of the pair of a seam welder in case the side side which carries out phase opposite in another side of the metal frame 12 and the metal lid 13 is welded He is trying for a twist to also serve as magnitude required for welding of the current which flows to the metal frame 12 through the contact section of the metal lid 13 and the metal frame 12 in directly under [of a seam welder / roller-electrode] by considering as a big current. however, from passing a bigger current than the time of welding the side side as for which either the metal frame 12 or the metal lid 13 carries out phase opposite between the roller electrodes of the pair of a seam welder, in case the side side which carries out phase opposite in this way in another side of the metal frame 12 and the metal lid 13 is welded The calorific value by the current which flows between the roller electrodes of the pair of a seam welder in case the side side of the pair of another side of the metal frame 12 and the metal lid 13 is welded becomes large. The sake, The crack occurred in the insulating base with the thermal shock and thermal stress by the generation of heat, or exfoliation occurred in the metal frame 12, and feelings of a package might be hurt greatly.

[0007] This invention is thought out in view of this conventional trouble, and in case the purpose welds a metal lid to a metal frame by the seam weld method, it is to offer the package for electronic-parts receipt which is excellent in the airtight dependability which a crack does not generate in an insulating base or exfoliation

does not generate in a metal frame, and its closure approach.

[0008]

[Means for Solving the Problem] The package for electronic-parts receipt of this invention on the top face of the insulating base which has the loading section by which electronic parts are carried in a top face In the package for electronic-parts receipt made as [join / on this metal frame / solder the metal frame of the shape of an abbreviation square frame which encloses the loading section, change, and / a metal lid] a metal frame It is characterized by being 1.2 to 2 times the width of face in the side which carries out phase opposite to the width of face in the side as for which one of these carries out phase opposite in another side of this.

[0009] Moreover, the closure approach of the package for electronic-parts receipt of this invention So that the loading section may be surrounded on the top face of the insulating base which has the loading section by which electronic parts are carried in a top face As opposed to the package body which solders the metal frame of the shape of an abbreviation square frame which made width of face in the side which carries out phase opposite to the width of face in the side as for which one side carries out phase opposite in another side 1.2 to 2 times, and changes A metal lid is laid in the top face of a metal frame, and after carrying out the seam welding of these metal frame and the metal lid along the side as for which one side carries out phase opposite, it is characterized by carrying out seam welding along the side which carries out phase opposite in another side.

[0010] According to the package for electronic-parts receipt of this invention, the width of face in the side which carries out phase opposite to the width of face in the side as for which one side of a metal frame carries out phase opposite in another side from having considered as 1.2 to twice After carrying out the seam welding of the side side as for which either a metal frame or a metal lid carries out phase opposite, In case the seam welding of the side side which carries out phase opposite in another side is carried out, in directly under [of a seam welder / roller-electrode], the area of the contact section of a metal lid and a metal frame will become large. Since the current for seam welding becomes easy to

flow to a metal frame through that part and the large contact section of this area, the current passed between the roller electrodes of the pair of a seam welder can be made small. Since the width of face in the side which carries out phase opposite in another side of a metal frame is twice [1.2 to] as wide as the width of face in one side to coincidence, to it, the thermal shock and thermal stress which are generated in case the seam welding of the side side of this another side is carried out are absorbable good in the side of another side of a metal frame.

[0011] Moreover, while laying a metal lid in the top face of a metal frame according to the closure approach of the package for electronic-parts receipt of this invention After the width of face of a metal frame is narrow and carries out the seam welding of a metal frame and the metal lid along the side which carries out phase opposite, From the width of face of a metal frame carrying out seam welding along the side which carries out phase opposite in another side large 1.2 to 2 times In case the width of face of a metal frame carries out seam welding along the side which carries out phase opposite in large another side Since the area of the contact section of a metal lid and a metal frame will become large in directly under [of a seam welder / roller-electrode] and the current for seam welding becomes easy to flow to a metal frame through that part and this contact section A thermal shock and thermal stress according the current passed between the roller electrodes of the pair of a seam welder to this current can be made into a small thing as a small thing. The thermal shock and thermal stress which are generated in case the seam welding of the side side of this another side is carried out to it, since that width of face is twice [1.2 to] as wide as the width of face in the side as for which one side carries out phase opposite to coincidence in the side which carries out phase opposite in another side of a metal frame are absorbable good in the side of another side of a metal frame.

[0012]

[Embodiment of the Invention] Next, this invention is explained based on an attached drawing.

[0013] Drawing 1 is the perspective view showing an example of the gestalt of

implementation of the package for electronic-parts receipt of this invention, and, as for an insulating base and 2, one is [a metal frame and 3] metal lids among drawing. And the container which holds electronic parts 6 airtightly mainly consists of these.

[0014] As for the insulating base 1, loading section 1a of the abbreviation square [die length of one side] concave for thickness having the shape of an abbreviation square which is about 0.5-3mm in about 2-20mm, and carrying electronic parts 6 in the top-face center section is prepared. Loading immobilization of the electronic parts 6 is carried out at this loading section 1a.

[0015] If it is the case where such an insulating base 1 consists of electrical insulation materials, such as a nature sintered compact of an aluminum oxide, and a nature sintered compact of aluminum nitride, a nature sintered compact of a mullite, glass ceramics, for example, it consists of the nature sintered compact of an aluminum oxide. The ceramic green sheet of two or more sheets is obtained by adopting the well-known doctor blade method etc. conventionally, and making this with the shape of a sheet, while carrying out addition mixing of suitable organic binder and solvent for raw material powder, such as an aluminum oxide, oxidized silicon, a calcium oxide, and magnesium oxide, and making with the shape of slurry. While performing suitable punching processing for each of these ceramic green sheets after an appropriate time, the laminating of these is carried out up and down, and it is manufactured by calcinating at the temperature of about 1600 degrees C.

[0016] moreover, two or more metallizing wiring derived from the base of loading section 1a through a side face to an insulating base 1 on the inferior surface of tongue -- covering formation of the conductor 4 is carried out. A conductor 4 functions as a track for connecting electrically to an external electrical circuit each electrode of the electronic parts 6 carried in loading section 1a. metallizing wiring -- The part which each electrode of electronic parts 6 was electrically connected to the loading section 1a bottom surface part through electrical connecting means, such as solder, and conductive resin, a bonding wire, and

was drawn on the inferior surface of tongue of an insulating base 1 is connected to an external electrical circuit through the electrical connecting means which consists of solder etc.

[0017] such metallizing wiring -- a conductor 4 consists of metal-powder metallizing, such as a tungsten, and molybdenum, copper, silver, and carries out printing spreading of the metal paste which carried out addition mixing and obtained suitable organic binder and solvent for metal powder, such as a tungsten, to a predetermined pattern with screen printing at the ceramic green sheet for insulating base 1, and covering formation is carried out by calcinating this with the ceramic green sheet layered product for insulating base 1 so that it may derive from the loading section 1a base of an insulating base 1 on the inferior surface of tongue through a side face.

[0018] in addition, metallizing wiring -- the front face of a conductor 4 -- metallizing wiring -- while a conductor 4 prevents carrying out oxidation corrosion effectively -- metallizing wiring -- if it usually comes out and is in order to make good connectability of a conductor 4 and an electrical connecting means, sequential covering of the gilding layer whose nickel-plating layer and thickness whose thickness is about 1-10 micrometers are about 0.1-3.0 micrometers is conventionally carried out by the well-known electrolysis galvanizing method and a well-known nonelectrolytic-plating method.

[0019] Furthermore, covering formation of the metallized layer 5 for soldering of the shape of an abbreviation square frame which changes from metal powder metallizing, such as a tungsten, and molybdenum, copper, silver, to it as encloses loading section 1a in the top face of an insulating base 1 is carried out. Thickness functions as a substrate metal for about 10-20 micrometers and the width of face of each side to be about 0.2-1mm, and join the metal frame 2 to an insulating base 1, as for this metallized layer 5 for soldering. And the metal frame 2 of the shape of an abbreviation square frame which encloses loading section 1a is soldered through wax material, such as silver solder, on the top face of this metallized layer 5 for soldering. Such a metallized layer 5 for soldering carries

out printing spreading of the metal paste which carried out addition mixing and obtained suitable organic binder and solvent for metal powder, such as a tungsten, to a predetermined pattern with screen printing at the ceramic green sheet for insulating base 1, and by calcinating this with the ceramic green sheet layered product for insulating base 1, as it encloses loading section 1a on the top face of an insulating base 1, covering formation is carried out.

[0020] In addition, if it is usual in order to make good wettability of the metallized layer 5 for soldering, and wax material, thickness is beforehand put on the front face of the metallized layer 5 for soldering, before the nickel-plating layer which is about 0.5-5 micrometers soldering.

[0021] Moreover, the metal frame 2 which will shine through wax material, such as silver solder, to the metallized layer 5 for soldering and which was attached and carried out consists of metals, such as an iron nickel alloy and an iron-nickel-cobalt alloy, and functions as a substrate metal member for welding the metal lid 3 to an insulating base 1. As this metal frame 2 shown to drawing 2 R> 2 in the plan of an insulating base 1 and the metal frame 2 the inner circumference -- opening of crevice 1a, and abbreviation -- it is the same magnitude, and about 0.1-0.25mm and the width of face of each side are about 0.15-1mm, and thickness makes further width of face W2 in the side of another side which carries out phase opposite the twice [1.2 to] as many size as this to the width of face W1 in one side of the metal frame 2 which carries out phase opposite.

[0022] And as shown in a perspective view, while laying the metal lid 3 in the top face of the metal frame 2 at drawing 3 After carrying out the seam welding of the side side as for which passes the high current for seam welding and either the metal frame 2 or the metal lid 3 carries out phase opposite between roller electrodes R, carrying out press rolling of the roller-electrode R of the pair of a seam welder on the periphery side as for which the metal lid 3 of a side with the narrow width of face of the metal frame 2 carries out phase opposite, Carrying out press rolling of the roller-electrode R of the pair of a seam welder on the periphery side as for which the metal lid 3 of a side with the wide width of face of

the metal frame 2 carries out phase opposite, as shown to drawing 4 in a perspective view By carrying out the seam welding of the side side which passes the high current for seam welding and carries out phase opposite between roller electrodes R in another side of the metal frame 2 and the metal lid 3, the closure of the container which the perimeter of the metal frame 2 and the metal lid 3 is joined, and consists of an insulating base 1, the metal frame 2, and the metal lid 3 is carried out airtightly.

[0023] In addition, it sets in the package for electronic-parts receipt of this invention. It is important to make into 1.2 to 2 times width of face W2 in the side which carries out phase opposite to the width of face W1 in the side as for which one side of the metal frame 2 carries out phase opposite in another side. After the width of face of the metal frame 2 carries out the seam welding of the narrow side side in the closure approach of the package for electronic-parts receipt of this invention, it is still more important to carry out the seam welding of the side side of another side. Thus, width of face W2 in the side which carries out phase opposite to the width of face W1 in the side as for which one side of the metal frame 2 carries out phase opposite in another side is made [1.2 to 2 times, and] large. After carrying out the seam welding of the side side where the width of face of the metal frame 2 is narrow, the side side of another side from carrying out seam welding In case the seam welding of the side side of another side is carried out, in directly under [of a seam welder / roller-electrode R], the area of the contact section of the metal lid 3 and the metal frame 2 will become large. Since the current for seam welding becomes easy to flow to the metal frame 2 through that part and the large contact section of this area While being able to make into a small thing a thermal shock and thermal stress according the current passed between the roller electrodes R of the pair of a seam welder to this current as a small thing, that thermal shock and thermal stress are absorbable good in the side of another side of the metal frame 2. Therefore, according to the package for electronic-parts receipt and the closure approach of this invention, it can prevent effectively that a crack occurs in an insulating base 1 in case the

seam welding of the metal lid 3 is carried out to the metal frame 2, or exfoliation occurs in the metal frame 2.

[0024] In addition, when the width of face W2 in the side which carries out phase opposite to the width of face W1 in the side as for which one side of the metal frame 2 carries out phase opposite in another side is less than 1.2 times, After carrying out the seam welding of the side side as for which either the metal frame 2 or the metal lid 3 carries out phase opposite, In case the seam welding of the side side which carries out phase opposite in another side is carried out, in directly under [of a seam welder / roller-electrode R], area of the contact section of the metal lid 2 and the metal frame 3 cannot be made large enough. The sake, While it is necessary to pass a bigger current between the roller electrodes R of the pair of a seam welder and the thermal shock and thermal stress by the current become large Since it becomes difficult to absorb those thermal shocks and thermal stress good in the side of another side of the metal frame 2, a crack occurs in an insulating base 1, or it becomes easy to generate exfoliation in the metal frame 2. On the other hand, if twice is exceeded, a package will be enlarged in order to form the metal frame 2 with such wide width of face. Therefore, the width of face W2 in the side which carries out phase opposite in another side to the width of face W1 in the side as for which one side of the metal frame 2 carries out phase opposite is specified as the 1.2 to 2 twice as many range as this.

[0025] Such a metal frame 2 is manufactured in the shape of [predetermined] a frame by piercing the plate which consists of an iron nickel alloy, an iron-nickel-cobalt alloy, etc. with a press machine.

[0026] moreover, it curses metal frame 2 -- attaching -- business -- the metal frame 2 is laid on both sides of the wax material of the shape of a foil whose thickness is 10-50 micrometers on the metallized layer 5 for soldering cursing to a metallized layer 5, and the approach of soldering the metallized layer 5 for soldering and the metal frame 2 is adopted by carrying out heating melting of the wax material after an appropriate time.

[0027] in addition, it cures after soldering -- attaching -- business -- that the metallized layer 5 for soldering, the metal frame 2, and wax material carry out oxidation corrosion in the exposure front face of a metallized layer 5, the exposure front face of the metal frame 2, and the exposure front face of wax material, in order to prevent effectively If it is usual, sequential covering of the gilding layer whose nickel-plating layer and thickness whose thickness is 0.5-5 micrometers are about 0.1-3.0 micrometers is conventionally carried out by the well-known electrolysis galvanizing method and a well-known nonelectrolytic plating method.

[0028] According to the package for electronic-parts receipt and its closure approach of this invention, in this way loading section 1a of an insulating base 1 - - electronic parts 6 -- each of that electrode -- metallizing wiring, while laying the metal lid 3 on the metal frame 2, after carrying out loading immobilization through an electrical connecting means, as it connects with a conductor 4 electrically It is made to join by carrying out the seam welding of the side side which carries out phase opposite in another side after carrying out the seam welding of the side side where one side of a side with the wide width of face of the metal frame 2 carries out phase opposite of the metal frame 2 and the metal lid 3. the interior of the container which consists of an insulating base 1, the metal frame 2, and the metal lid 3 by that cause -- electronic parts 6 -- airtight dependability -- the closure is carried out highly.

[0029] In addition, if this invention is range which is not limited to the example of a gestalt of above-mentioned operation, and does not deviate from the summary of this invention, it cannot be overemphasized that various modification is possible. For example, although the width of face of the metal frame 2 was narrow and large by the shorter side side by the long side side with an example of the gestalt of above-mentioned operation, as shown to drawing 5 in a plan, by the long side side, the width of face of the metal frame 2 may be wide, and may be narrow by the shorter side side.

[0030]

[Effect of the Invention] According to the package for electronic-parts receipt of this invention, the width of face in the side which carries out phase opposite to the width of face in the side as for which one side of a metal frame carries out phase opposite in another side from having considered as 1.2 to twice After carrying out the seam welding of the side side as for which either a metal frame or a metal lid carries out phase opposite, In case the seam welding of the side side which carries out phase opposite in another side is carried out, in directly under [of a seam welder / roller-electrode], the area of the contact section of a metal lid and a metal frame will become large. Since the current for seam welding becomes easy to flow to a metal frame through that part and the large contact section of this area While being able to make small the current passed between the roller electrodes of the pair of a seam welder, the thermal shock and thermal stress which are generated in case the seam welding of the side side of this another side is carried out are absorbable good in the side of another side of a metal frame. Therefore, the package for electronic-parts receipt which is excellent in the airtight dependability in which a crack does not occur in an insulating base or a metal frame does not exfoliate can be offered.

[0031] Moreover, while laying a metal lid in the top face of a metal frame according to the closure approach of the package for electronic-parts receipt of this invention After carrying out the seam welding of a metal frame and the metal lid along the side as for which one side carries out phase opposite, From the width of face of a closure frame carrying out seam welding along the side which carries out phase opposite in another side large 1.2 to 2 times In case the width of face of a closure frame carries out seam welding along the side which carries out phase opposite in large another side Since the area of the contact section of a metal lid and a metal frame will become large in directly under [of a seam welder / roller-electrode] and the current for seam welding becomes easy to flow to a metal frame through that part and this contact section The thermal shock and thermal stress which are generated in case a thermal shock and thermal stress according the current passed between the roller electrodes of the pair of a

seam welder to this current can be made into a small thing as a small thing and ** carries out the seam welding of the side side of this another side are absorbable good in the side of another side of a metal frame. Therefore, the closure approach of the package for electronic-parts receipt of excelling in the airtight dependability which a crack does not generate in an insulating base or exfoliation does not generate in a metal frame can be offered.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view showing an example of the gestalt of implementation of the package for electronic-parts receipt of this invention.

[Drawing 2] It is the plan of the insulating base 1 of the package for electronic-parts receipt shown in drawing 1 , and the metal frame 2.

[Drawing 3] It is a perspective view for explaining the closure approach of the package for electronic-parts receipt of this invention.

[Drawing 4] It is a perspective view for explaining the closure approach of the package for electronic-parts receipt of this invention.

[Drawing 5] It is a plan equivalent to drawing 2 which shows other examples of

the operation gestalt of the package for electronic-parts receipt of this invention.

[Drawing 6] It is the perspective view showing the conventional package for electronic-parts receipt.

[Description of Notations]

1 Insulating base

1a ... Loading section

2 Metal frame

W1 Width of face in the side as for which one side of the metal frame 2 carries out phase opposite

W2 Width of face in the side which carries out phase opposite in another side of the metal frame 2

3 Metal lid

6 Electronic parts

R Roller electrode of a seam welder

[Translation done.]

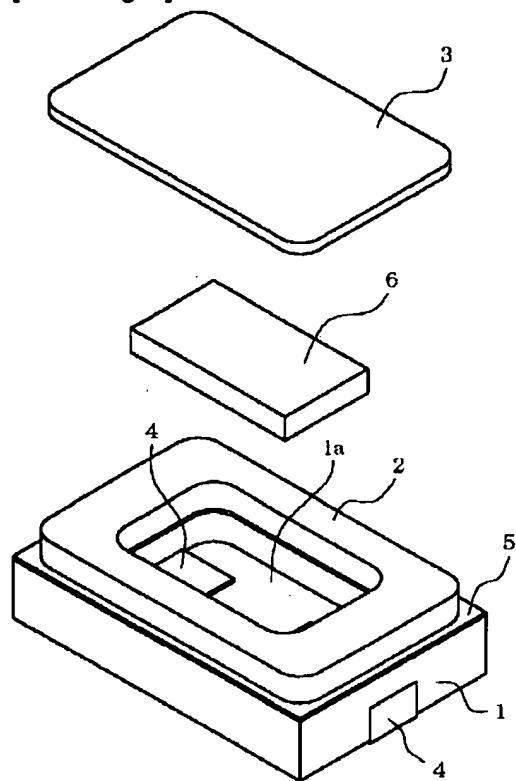
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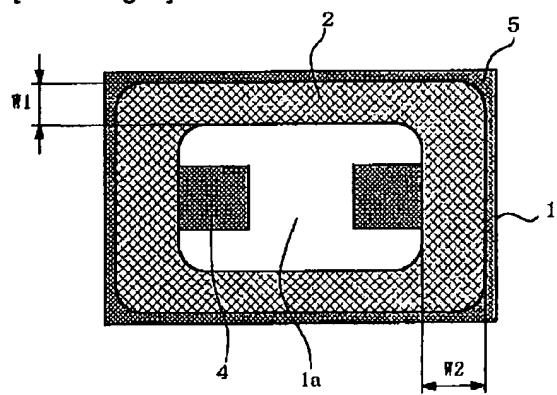
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DRAWINGS

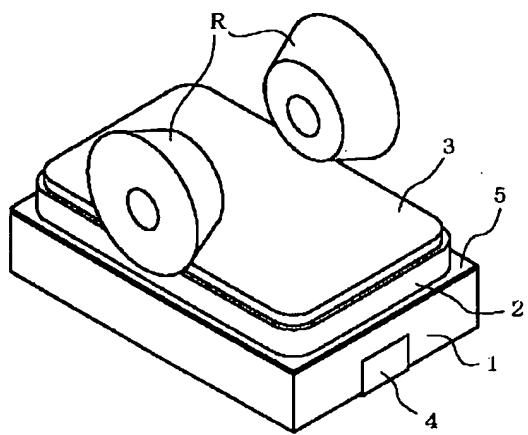
[Drawing 1]



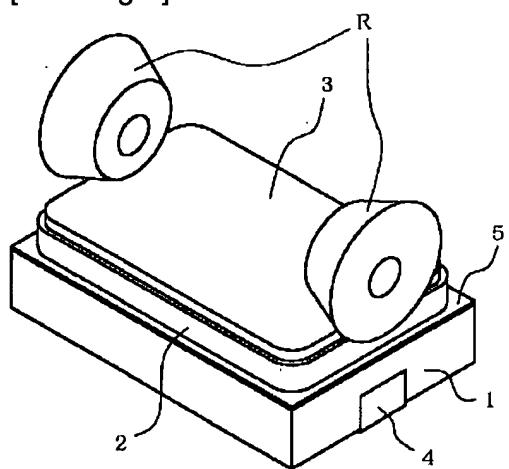
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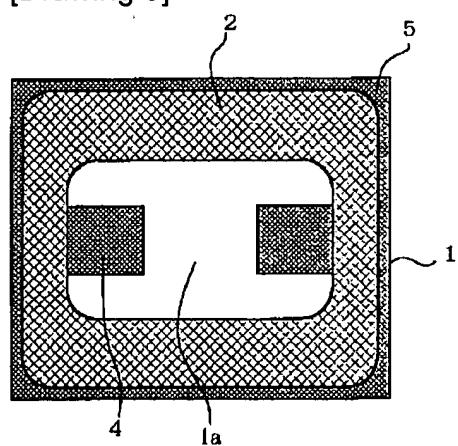
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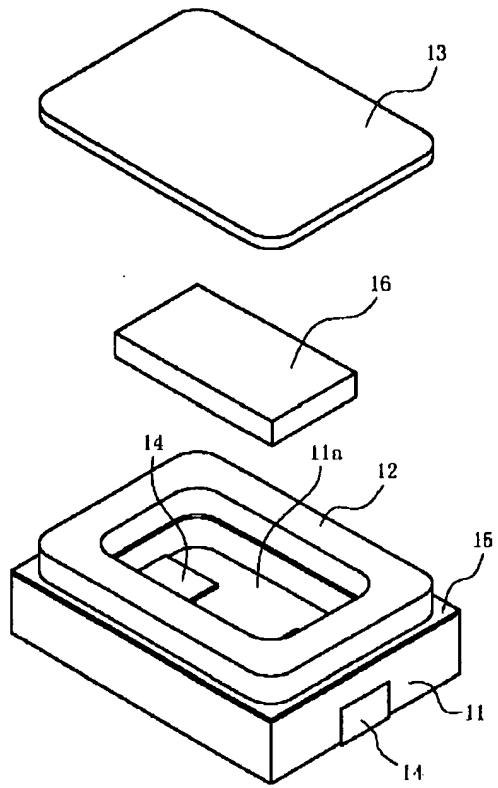
[Drawing 4]



[Drawing 5]



[Drawing 6]



[Translation done.]